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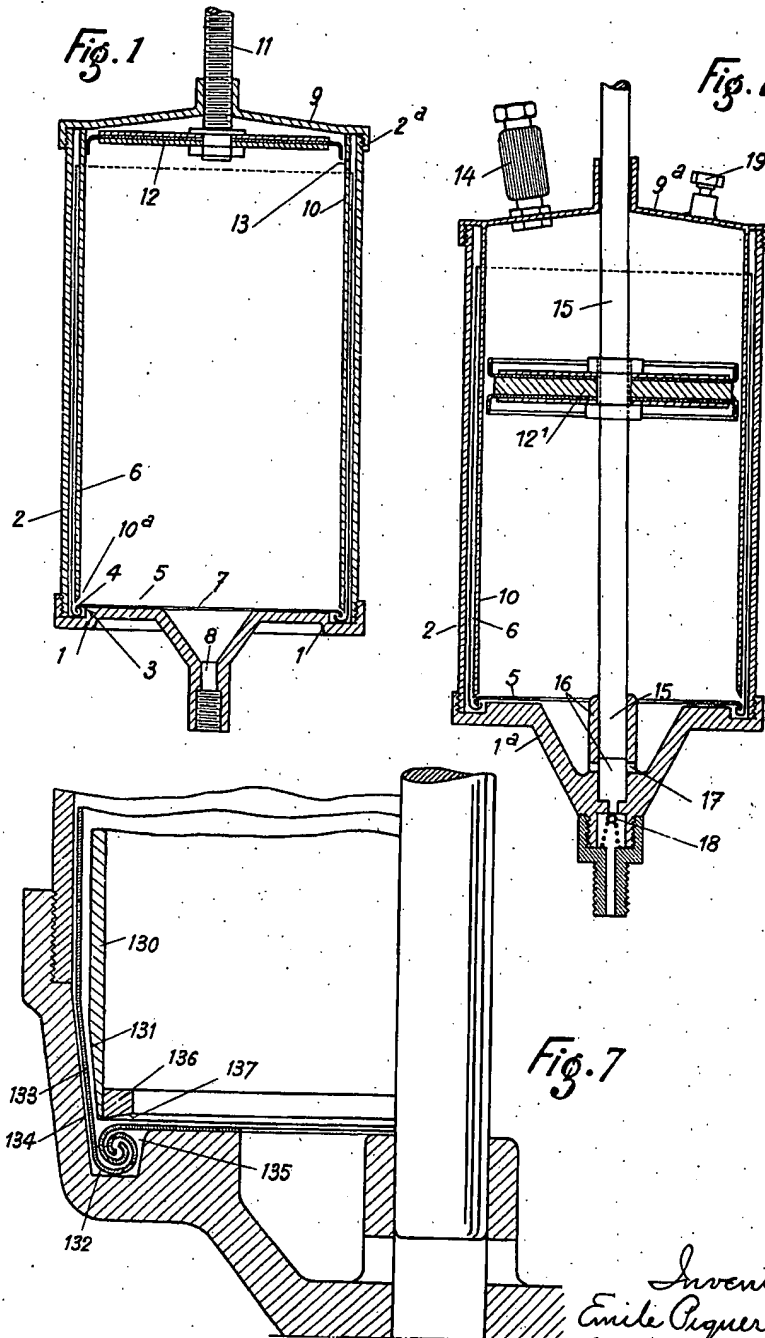
E. PIQUEREZ

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GREASING APPARATUS

Filed Dec. 24, 1936

4 Sheets-Sheet 1



Inventor
 Emile Piquerez
 By Sommers & Young
 Attys

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Fig. 3

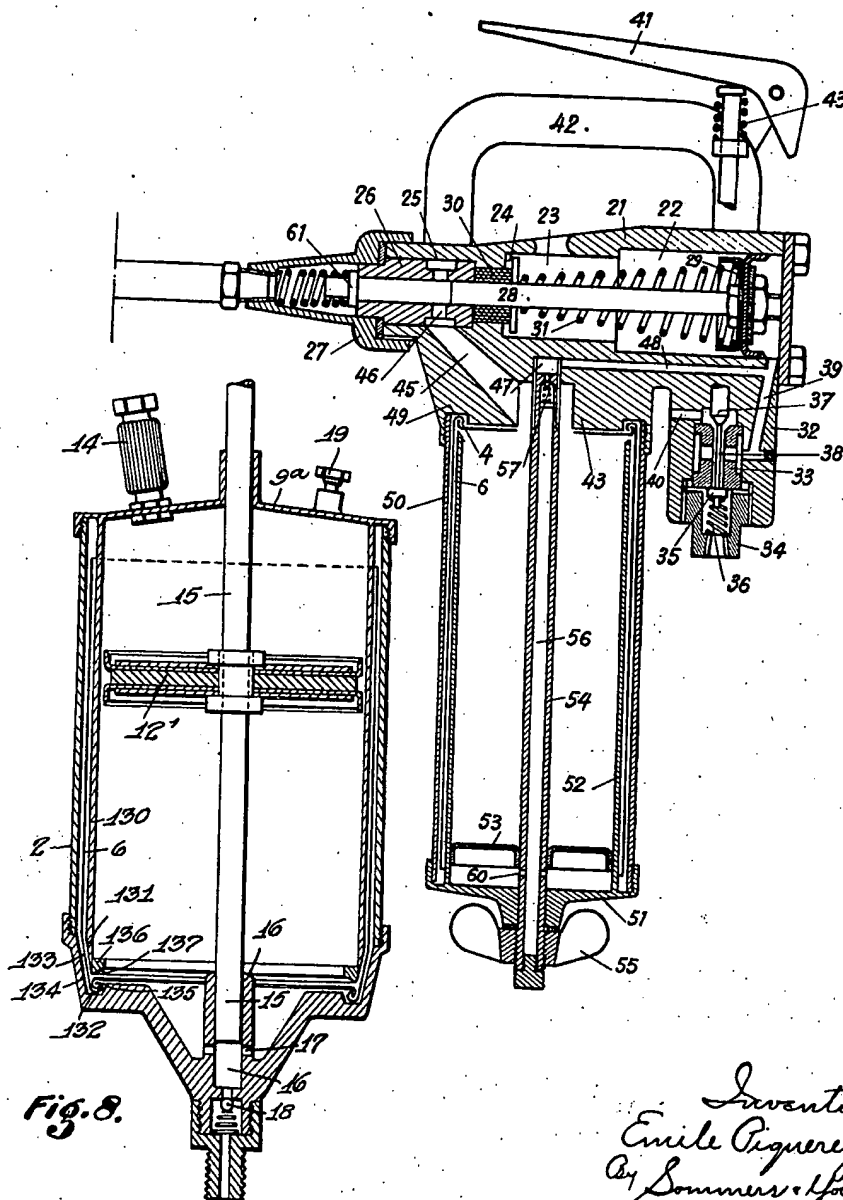


Fig. 8.

Inventor
Emile Piquerez
By Sommer & Spring
Attys

April 5, 1938.

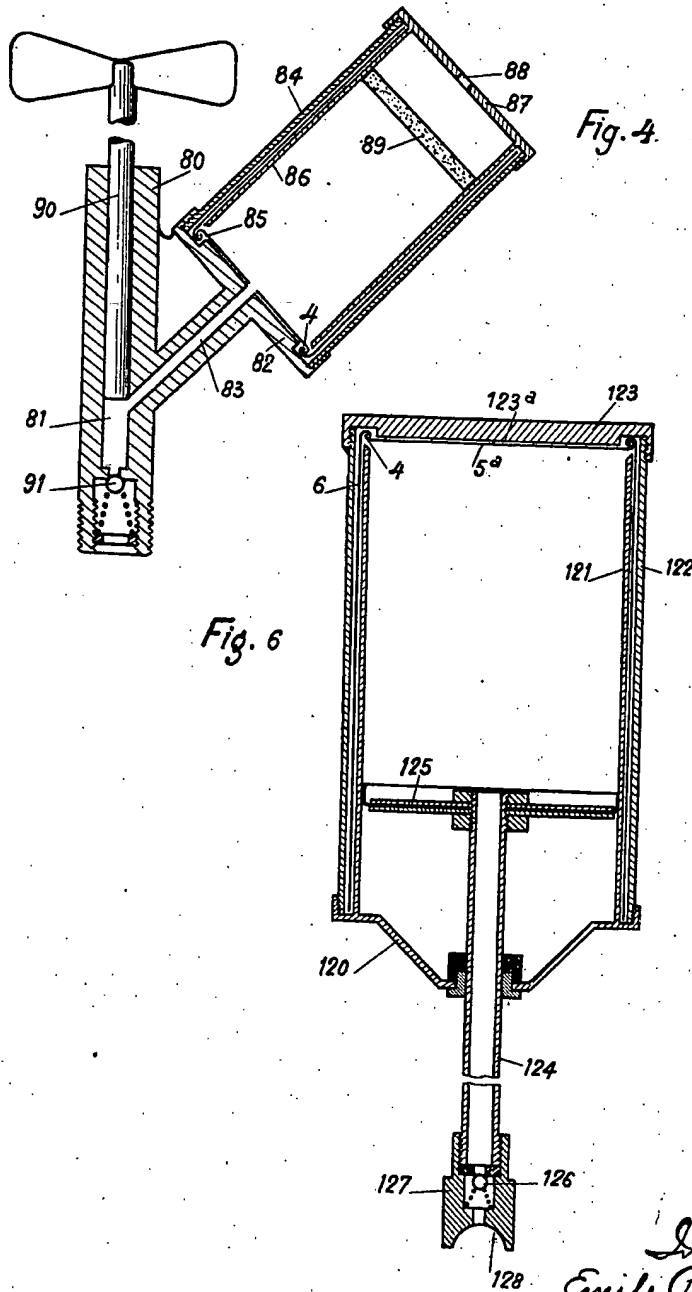
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Inventor
Emile Piquerez
By Sommers, Young
Attys

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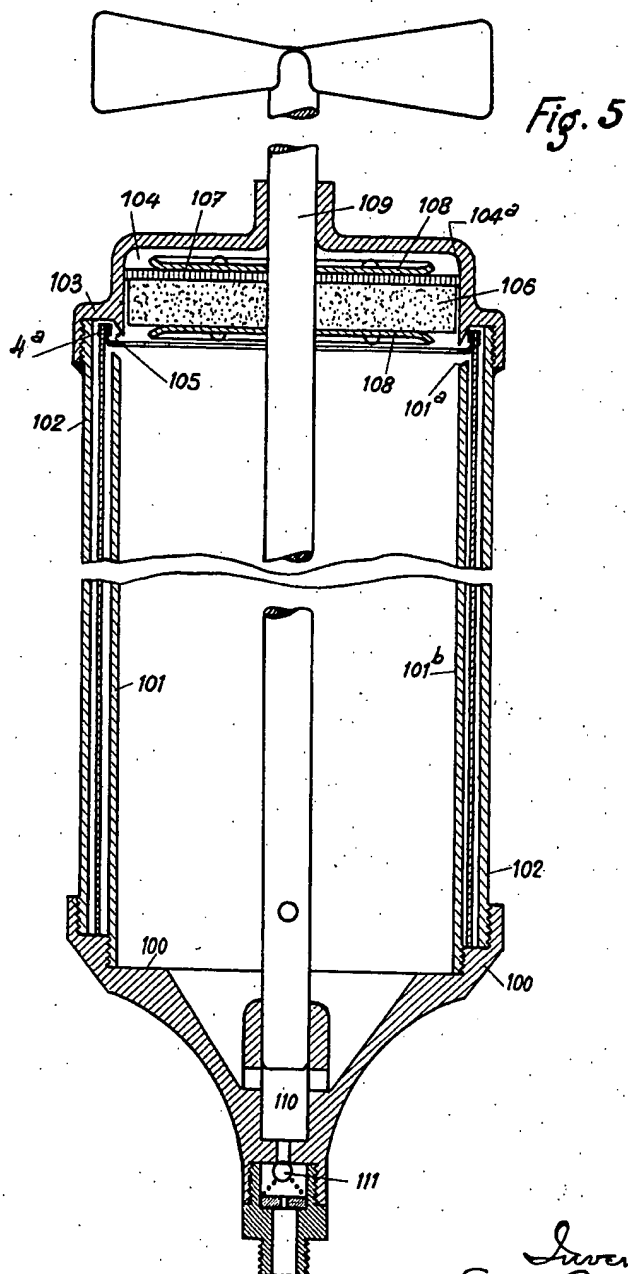
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Inventor
Emile Piquerez
By Sommers & Young
Attys

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UNITED STATES PATENT OFFICE

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GREASING APPARATUS

Emile Piquerez, Saint Cloud, France

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6 Claims. (Cl. 221-47.3)

Receptacles for set or semi-set grease which consist of "cartridges" made of special semi-rigid and impervious paper are known and it has already been proposed to fill greasing apparatus by introducing such cartridges into the reservoir or into the pump cylinder.

In all the hitherto known embodiments of this combination, the cartridge has been closely surrounded by the rigid wall of the reservoir or the pump cylinder, according to whether the reservoir is independent or is a part of the pump cylinder, and encloses in most cases a piston applied under pressure against the surface of the lubricant. In general, such apparatus has not given satisfactory results, as the cartridge has been only incompletely emptied owing to the fact that responsive to the pressure, the weakly supported wall of the cartridge was deformed and became creased and imprisoned small masses of lubricant which never reached the outlet.

The present invention has for its object to overcome this drawback. For this purpose it essentially consists in the fact that the cartridge is no longer provided with an outer casing, but with an inner reinforcement formed by the wall of the reservoir or the pump cylinder itself from which the lubricant is expelled, either directly to the outside, or towards a high pressure cylinder, the transfer of the lubricant from the cartridge to said cylinder being automatically effected when one penetrates into the other.

The apparatus according to the invention can be considered as of two classes according to whether the pump cylinder or reservoir is inserted into the cartridge, or the cartridge is placed onto said pump cylinder or reservoir.

In the apparatus of the first class, the frame of the apparatus is provided with a base to support the cartridge from which the upper cover has been previously removed and which is provided with an opening at its lower part, whereas the pump cylinder or reservoir, which is provided with a single cover at the upper part, is removable from said frame and can be inserted in said cartridge, and has means for connecting it to the frame.

In a particularly advantageous embodiment, the cover of the pump cylinder or of the reservoir is provided with an overlapping crown provided with a threaded collar, or with any other appropriate means which can be connected with a covering casing of the frame which extends from the base of the frame around the cartridge.

The delivery system carried by the removable pump cylinder cover can be of any kind. It can comprise a sufficiently large piston delivering di-

rectly at low pressure into an outlet nipple carried by the base of the apparatus, or it can comprise a follower piston which is free to be driven by a supply of air under pressure, said piston effecting the filling of an apparatus in which a plunger piston is displaceable and which is guided and supported by the upper cover of the removable pump cylinder.

In the case of a reservoir which is independent of the pump, the removable body of the reservoir will be provided with a follower piston which is free to be driven by compressed air, so that it drives the lubricant towards the pump cylinder.

The apparatus of the second type is principally characterized by the combination of a pump or reservoir cylinder fixedly mounted on the base of the apparatus and open at its upper part, of a cartridge fitted onto said pump cylinder, and of an outer casing secured to the cover and screwing onto the base, the cover carrying the delivery piston or pistons, whereas the delivery nipple and optionally the high pressure chamber are integral with or are secured to the base of the apparatus.

In a modified embodiment, the cover does not carry any delivery member and the pump cylinder is displaceable relatively to the follower and delivery piston mounted at the end of the delivery nipple. The invention provides furthermore means for ensuring hermeticity between the pump cylinder or the reservoir and the outlet of the cartridge, in an apparatus of the first kind.

For this purpose, the lower end of the pump body or of the reservoir is adapted to flatten the lower closure beading of the cartridge in a groove provided in the base of the apparatus, so that the said beading serves as a joint.

This arrangement is applicable with a cartridge and a pump or reservoir body which are cylindrical. However, according to an improved embodiment, the lower part of the cartridge is slightly conical and the lower part of the pump or reservoir body is amply bevelled so as to accurately engage in the inner angle of the cartridge cover to cause a rational crushing of the entire beading.

This device can be advantageously completed by providing at the lower part of the pump or reservoir body and inside same, a ring which is adapted to stop the follower piston at the end of its stroke and also to cooperate in flattening the said beading.

The accompanying drawings show by way of example various embodiments included in the scope of the present invention.

Fig. 1 is a vertical section of an apparatus of the first-mentioned type having a reservoir form-

ing a pump chamber, and a low pressure delivery system.

Fig. 2 is a section of the same type of apparatus as Fig. 1 but provided with a high pressure delivery system.

Fig. 3 is a section showing the application of the same type of apparatus to a compressed air delivery apparatus.

Fig. 4 is a section of an apparatus of the first-mentioned type having an independent reservoir.

Fig. 5 is a section of an apparatus of the second type, that is to say constructed for the cartridge to be fitted onto the pump cylinder or reservoir body.

Fig. 6 is a vertical section of an apparatus of the second type.

Fig. 7 is a section of an improved system for ensuring hermeticity between the cartridge and the lubricant outlet.

Fig. 8 is a sectional view of an apparatus according to Fig. 2 modified to include the means for sealing the cartridge against the support, according to Fig. 7.

In the embodiment of Fig. 1, the invention is applied, for example, to a low pressure delivery apparatus. The apparatus comprises a base 1 on which is mounted a casing 2 concentrically with a circular groove 3 provided in said base. Said groove is adapted to receive the beading 4 formed by the seam of the cover 5 and of the side wall of the grease cartridge 6. A sufficient space allowance is provided to enable the cartridge to be easily placed in position on its support, after having removed its upper cover from the said cartridge and having removed the closure of its lower orifice 7. The orifice 7 places the cartridge in communication with the outlet nipple 8 of the pump.

At its upper part, the casing 2 has for example a thread 2a to receive a screwed cover 9 which forms the upper cover of the pump casing 10, which is fixed thereto in any appropriate manner.

The casing 10 has no lower cover and its outer diameter is slightly less than the inner diameter of the cartridge 6. The lower edge of its wall can be advantageously bevelled at 10a as shown, to form a scraper. At the top the casing 10 is provided with an air vent hole, its capacity below said hole being at least equal to that of the cartridge.

The cover 9 has at its center a tapped hub in which the rod 11 of the piston 12 screws, which can be operated by an outer handle.

The filling of the apparatus is effected as follows: The cover 9 and the pump casing 10 are disconnected from the frame and the piston 12 is positioned at top of the casing 10 above the air vent 13.

After having removed the upper cover and the closure of the orifice 7 of the cartridge, the cartridge is placed in position on the base 1, so that the beading 4 is accommodated in the groove 3. Then the lower edge of the pump casing 10 is held above the cartridge and said casing is progressively pushed into the cartridge. The grease contained in the cartridge then penetrates gradually into the pump body, driving out the air through the hole 13. As it moves downwards the bevelled edge 10a scrapes the grease and when it reaches the bottom of its stroke, corresponding to the screwing of the cover, it flattens the beading 4 in its groove thereby ensuring hermeticity between the cartridge and the outlet nipple. A few turns of the pump screw are then

given to bring the piston 12 into contact with the grease and the apparatus is ready to deliver at low pressure.

Fig. 2 shows the application of the same arrangements to a high pressure greasing apparatus.

In this case, a connection 14 supplies compressed air above the piston 12 which is a simple follower piston adapted to slide freely on the rod 15 which itself slides through the cover 9a, the lower extension of said rod forming a high pressure piston. Said piston is displaced in the high pressure cylinder 16 provided on the base 1a, and having inlet ports 17. Beyond said cylinder is mounted a delivery valve 18.

Without changing the characteristic arrangements of the invention, a third apparatus can be constructed by eliminating the connection 14, the follower piston being in that case displaced under the influence of atmospheric pressure.

The mounting, as regards the cartridge and the pump body, is effected as before with the sole difference that when the pump cylinder is about to be entered into the cartridge, the follower piston is placed at the lower part of said cylinder, so that it is pushed upwards by the grease, as the cylinder 10 is pushed in. During this operation, the air outlet 19 remains open.

Fig. 3 shows the application of the same arrangements to an apparatus in which the discharge towards the high pressure cylinder, and the delivery proper are effected by means of compressed air.

The apparatus comprises a body 21 having a horizontal bore of several diameters formed therein, in which the lubricant compressor assembly moves. Said bore consists of a bore 22 in which is mounted an air driven piston; a part of smaller diameter 23 communicating with the outside; a partition 24 having an opening therein, and a recess which receives the cylinder 26 of the grease pump. The cylinder 26 is pressed against the partition 24 by a nut 27. In said cylinder the piston 28 is displaceable, and is directly connected to a compressed air driven piston 29. A hermetic packing 30 is lodged in the opening of the partition 24; said packing being pressed against the end of the cylinder 26 by a spring 31 which bears with its other end on the rear face of the compressed air driven piston 29.

A double acting valve controls the inlet and exhaust of the air. Said valve is housed in an extension 32 of the body of the apparatus. In this portion of the part are provided various housings, in which is placed double seat 33 held in place by a hollow nut 34. A valve 35 urged by a spring 36 is pressed against the lower part of said seat. At the upper part of the double seat 33 is provided the seat of a needle valve 37; said needle valve being extended by a rod 38 of smaller diameter than the central duct of the part 33 and which, when at rest, comes into contact with the head of the valve 35 in such a manner that when the needle valve 37 is seated, the valve 35 is open, and conversely.

The ducts provided in the middle of the part 33 communicate through the duct 39 with the end of the air driven cylinder, whereas the housing of the needle valve 37 communicates with the atmosphere through a duct 40. The needle valve 37 is extended upwardly by a rod, which bears on an operating handle 41 carried by a grasp handle 42. A retracting spring 43 tends to hold the needle valve constantly away from its seat.

At the opposite part of the grasp handle, the body 21 has a machined base 43, at the center of which a recess 44 communicates with the ports 46 provided in the grease cylinder 26. At the center of the recess 44 is provided a tapped hole 47 which communicates through a duct 48 with the duct 39 supplying air to the actuating cylinder.

The base 43 has a groove 49 for housing the beading 4 of the grease cartridge 6 and it carries the casing 50. The cover 51 carries the reservoir body 52 in which the follower piston 53 is displaceable. Said cover fits into the casing and fits over a hollow rod 54 screwed into hole 47.

The locking of the cover is effected by a nut 55.

The cartridge being in position and a source of compressed air being connected to the orifice of the plug 34, the operation is as follows:

When the handle 41 is depressed, the needle valve 37 is applied on its seat, whereas the extension 38 bears on the valve 35 and compels it to open. The compressed air thus penetrates into the duct 39 and into the duct 48. Through the first it reaches the air cylinder and pushes the piston forward compressing the spring 31. At the same time the air introduced through the duct 48 and the hole 47 penetrates into the duct 56 of the rod 54, lifting the ball 57 and through the orifices 60, flows between the cover 51 and the piston 53 compelling the latter to drive the grease above it.

The grease is thus forced through the duct 45 and reaches the ports 46 of the grease cylinder.

When the handle 41 is released, the valve 35 closes again, cutting off the supply of compressed air, whereas the needle valve 37 places the duct 39 in communication with the atmosphere through the orifice 40. The air which is in the cylinder escapes by this path.

During this period of exhaust, the air introduced behind the piston 53 cannot escape since it is imprisoned by the closing of the ball 57. Said piston therefore continues to push the grease which fills the grease cylinder as soon as the piston 28 has uncovered the ports 46.

A further pressure on the handle 41 causes a fresh stroke of the super compression piston and drives out this lubricant beyond the pump 61 towards the place where it is to be used. At the same time a certain quantity of air is again introduced behind the piston 53 of the grease reservoir.

Fig. 4 shows the application of the same characteristic arrangements to a greasing apparatus having an independent reservoir.

The body 80 of the apparatus in which is formed the high pressure cylinder 81 has at one side a base 82 provided with a central orifice 83 which communicates with said cylinder and means such as a threaded collar for fixing the casing 84 thereto. Said base also has a groove 85 for housing the beading 4 of the cartridge 6. The cylinder 86 of the reservoir is dimensioned to fit within the cartridge 6 and the casing 84 in the same manner as the cylinder 10 of the preceding embodiments with respect to the cartridge 6 and the casing 2. It is secured to a cover 87 which screws onto the top of the casing 84 and has an air orifice 88 adapted to enable the action of atmospheric pressure to be exerted on the free follower piston 89.

The delivery system comprises a piston 90 sliding in the cylinder 21 and a valve 91.

The mounting and filling operation is effected

as in the embodiment shown and described in connection with Fig. 2.

Fig. 5 shows a first embodiment of an apparatus of the second type, that is to say adapted to be mounted in the reverse manner to the preceding ones, by fitting the cartridge onto the pump body; said apparatus being for example of the low pressure type.

The base 100 in this embodiment carries the pump body 101 and receives the casing 102 which is secured to the cover 103 when the cartridge 6, which is turned upside down after removing one of its covers, is placed in position, the outer diameter of the body 101 being dimensioned as before, so that the inner wall of the cartridge 15 is scraped by the edge 101a.

The cover 103 is screwed and soldered on the upper end of the casing 102. It has a bulge 104 of which the inner wall 104a comes into alignment with the inner wall 101b of the body 101, said bulge being adapted to house the follower piston.

In order to enable this fitting to be effected, a cartridge is preferably used of which the flange 4a, near at least one of its covers is of small thickness. Said flange is formed for example by the juxtaposition of two thicknesses: that of the body and that of the flange of the cover, pinched together by fasteners spaced at intervals. In this manner, in spite of the necessity for aligning the wall 104a with the wall 101b, a preferably outwardly bevelled projection 105 can be made integral with the cover, to push back and hold the flange 4a outside the path of the piston 106. The latter, which when at rest is lodged in the cover, is preferably of the rigid type, that is to say, does not have a flexible shank, because of the empty space to be passed between the two walls 104a, 101b. It comprises for example a cork disc 106, a leather washer 107, and two metal washers 108, the leather washer being slightly larger than the cork disc so as to rub on the walls.

This apparatus is provided with a plunger piston 109 adapted to cooperate with the high pressure cylinder 110 formed in the base 100, to deliver through the valve 111.

The mounting and filling operation is effected in the following manner:

The group of members 103—102—106—109 being detached from the apparatus and the cartridge having had its end covers completely removed, said cartridge is placed in the receptacle formed by the casing 102 and the cover 103. The whole arrangement is then turned over on the body 101 and is gradually pushed in until the edge of the end of the cartridge which is at the upper part, bears against the top of the body 101, which is finally obtained by screwing the casing on the base. The piston 109 is then pushed, it is actuated several times lightly, to drive out the air if necessary, and when the grease reaches the cylinder 110 the apparatus is ready to operate.

The arrangements according to the invention, of the apparatus of Fig. 5 necessitate, as has just been seen, the removal of the second cover of the cartridge.

The arrangements shown in Fig. 6 obviate this necessity.

On the cover or base 120 is fixed the pump body 121 and is screwed the casing 122 which is secured at its upper part to the cover 123. The latter is adapted to hold the beading 4 of the cartridge 6 in cooperation with the top of the

body 121 and to provide a bearing face 123a above the end 5a.

The base 120 can slide on the tubular rod 124 of the delivery follower piston 125. The valve 126 is lodged for example in the head 127 provided with a concave spherical surface 128 to bear on a grease coupling to which the grease is to be supplied, the delivery being effected by pressing on the actual body of the apparatus.

In the embodiments of Figs. 5 and 6, the casing could obviously be disconnected from the cover and fixed beforehand on the base, but under these circumstances the pushing in of the cartridge would be very inconvenient. The cover would be positioned last.

A number of other modifications are obviously included in the scope of the invention, since the latter can be applied to all apparatus having a suitable reservoir, whether said reservoir forms a pump cylinder or whether it is independent of the latter.

In the foregoing, it has been mentioned that the hermeticity between the cartridge and the lubricant outlet could be obtained by crushing the peripheral beading of the cover between the supporting base, or the cover, and the end of the pump or reservoir body.

To obtain the crushing of said beading under completely rational conditions, it will be advantageous to use the arrangement of Fig. 7 which essentially consists in providing at the end of the pump or reservoir body 130, a long bevel 131 and in disengaging the beading 132, from the inside, and in providing on the cartridge immediately above the end a conical portion 133 corresponding to said bevel. Outside the cartridge, the base could also have a conical bearing portion 134. It will be readily seen that owing to this arrangement, the sharp end of the body will engage with certainty in the inner angle of the beading and will push the latter towards the joint wall 135.

The device can be completed by mounting at the bottom of the body 131, a retaining ring or cord 136 for the follower piston, which have an oblique face 137 suitably directed to cooperate in crushing the beading 132. Such an arrangement could moreover be used with the preceding devices. Fig. 8 illustrates the arrangement applied to an apparatus otherwise similar to that of Fig. 2.

What I claim is:

1. In a greasing apparatus, a grease cartridge of flexible material having side walls and an end wall connected by an inwardly rolled seam, a frame having a support for supporting said end wall of the grease cartridge, a casing surrounding the sides of the cartridge, a cylinder slidable into the cartridge fitting closely against said side walls, and engaging the rolled seam and flattening it against the support to seal the periphery of the end, said end wall having a central opening, and the support discharge passage communicating with said opening and means for pressing grease from said cartridge through said opening.

2. In a greasing apparatus, a grease cartridge of flexible material having side walls and an end wall, said walls being connected by an inwardly rolled seam, the side walls being conical in the vicinity of the end wall, a supporting base for supporting the end wall of the cartridge, a casing surrounding the side walls of the cartridge and being formed conically adjacent the conical portion of the cartridge, said supporting base having an annular groove extending therearound

adjacent the seam of the cartridge for receiving said seam, a cylinder slidable within the cartridge from the end opposite the support and closely fitting the side walls of the cartridge, said cylinder being bevelled at its inner end to conform with the conicity of the cartridge, the inner end of said cylinder having an inwardly extending ring adapted to engage the seam and press the seam into said groove to form a seal between the outer edge of the end wall of the cartridge and the support, said end of the cartridge having a central discharge opening, said support having a discharge passage, and means for forcing grease from said opening to said passage.

3. In combination: a supporting base, a casing fixed on said base, a high pressure cylinder in said base, a delivery valve lodged in said base, a cartridge of lubricant made of paper and the like lodged in said casing, said cartridge being open at its upper part and provided with a cover at its lower part, said cover being provided with an outlet opening communicating with the high pressure cylinder; a reservoir cylinder, open at its lower part fitted into said cartridge, an end forming a cover at the upper part of said reservoir, a low pressure piston displaceable in said cylinder and a plunger piston passing through the cover of the reservoir cylinder and the low pressure piston.

4. In combination: a reservoir cylinder of a greasing apparatus open at its upper part, a base for said cylinder, a cartridge of lubricant made of paper and the like fitted onto said cylinder, an outer casing fitted onto said cartridge and adapted to be removably fixed to the said base, a cover secured to the upper part of the casing, a follower piston lodged in said cover, a plunger piston passing through said cover and said follower piston and removable as a unit with said cover, said follower piston and the casing; and a high pressure cylinder, and a delivery valve both in the base of the reservoir cylinder.

5. Supply reservoir for a greasing apparatus comprising: a metal casing, a base for said casing; a cartridge of lubricant made of paper and the like provided with a lower cover and having no upper cover, the side wall of said cartridge having a conical portion adjacent said cover, said conical portion being connected to said cover by a fastening forming a projecting beading; said cartridge being engaged in said casing with its lower cover pressed against the base of the casing; and the base of the casing having a groove to receive the projecting beading of the cartridge of lubricant, a metal reservoir body adapted to be pushed into said cartridge in contact with its wall, the end of said body having an outer bevel corresponding to the conicity of the part of the side wall of the cartridge, adjacent the cover of the latter so that said end of the reservoir body can completely crush the beading of the cartridge when said body is fully pushed in place.

6. In combination: a metal casing and a base for said casing; a high pressure cylinder and a delivery valve in said base; a cartridge of lubricant made of paper or the like provided with a lower cover and having no upper cover, the side wall of said cartridge having a conical portion adjacent said cover, said conical portion being connected to said cover by a fastening forming a projecting beading; said cartridge being engaged in said casing with its lower cover pressed against the base of the casing; and the base of the casing having a groove to receive the projecting bead-

ing of the cartridge of lubricant; a metal reservoir body adapted to be pushed into said cartridge in contact with its wall, the end of said body having an outer bevel corresponding to the conicity of the part of the side wall of the cartridge adjacent the cover of the latter so that said end of reservoir body can completely crush the beading of the cartridge when said body is fully pushed in place, a low pressure follower piston displaceable in said reservoir body; a stop ring for said piston, at the lower part of said

reservoir body, said ring being adapted to cooperate for flattening the beading of the cartridge; an upper cover secured to the reservoir body, said cover having a flange adapted to be removably connected with the top of the casing when the reservoir body is fully pushed in place in the cartridge, said body having an orifice to allow air to escape when it is pushed into said cartridge.

EMILE PIQUEREZ.

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